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Stochastic Search in 1D: Optimizing the search time CHRISTY CONTRERAS, Arizona State University, SIDNEY REDNER, Santa Fe Institute — We investigate the efficiency of several search strategies in one dimension. First we simulate an unbiased stochastic search with multiple searchers. We consider an infinitely long one-dimensional line where N searchers are launched from an initial position x = L at t = 0 in an attempt to reach a target at x = 0. We simulate this process computationally for multiple searchers to find the optimal number of searchers to minimize the search cost and compare our computational results to the analytical results from Meerson and Redner, 2014. We find that the distribution of the search cost follows a power law distribution on a log-log scale. Secondly, we consider a biased search with one biased random walker that is reset to its starting point with rate r and the direction of the bias alternates with every reset. We simulate the case without diffusion computationally for various rates to find the optimum resetting rate r* and compare our results with analytical results. Lastly, we consider a resetting search with a fixed diffusion and vary the magnitude of the bias in both directions to determine how the minimum search time corresponding to each optimal resetting rate is affected as the magnitude of the bias increases.

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